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Exploring Urban Forestry Non-Governmental Organizations in the Temperate Forest Region of the United States

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EXPLORING URBAN FORESTRY NON-GOVERNMENTAL ORGANIZATIONS IN THE TEMPERATE FOREST REGION OF THE UNITED STATES

A Thesis Presented

by

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DEDICATION

This work is dedicated to Mr. William H. Lewis, Jr., my high school horticulture teacher. Thank you for introducing and encouraging me into the field of study that has wholly filled my professional and personal life.

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ABSTRACT

EXPLORING URBAN FORESTRY NON-GOVERNMENTAL ORGANIZATIONS IN THE TEMPERATE FOREST REGION OF THE UNITED STATES

MAY 2022

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The environmental and human health benefits of urban forests have been well documented. In the United States, volunteers conduct 5% of municipal tree care-related activities in urban forests. A literature review related to urban forestry volunteers in the United States was conducted and it was concluded that urban forestry volunteers are often organized via a committee or non-governmental organization (NGO) and that there is limited understanding around many of these entities. Following Dillman's methods, an electronic qualitative survey with a primary objective of better understanding their characteristics was disseminated to urban forestry NGOs throughout the temperate forest region of the United States. Private citizens are significant partners that are essential in forming and funding urban forestry NGOs. More than 40% of organizations were established to extend limited municipal resources and improve urban tree canopy cover. Nearly 80% of responding NGOs had helped develop, shape, or implement local urban forestry-related policy in their community.

INTRODUCTION

Urban forests have been defined as all woody plants and vegetation in and around densely populated settlements (Miller, Hauer, & Werner, 2015). The benefits of urban forests to the environment and human health have been well documented (Nowak & Greenfield, 2018a; Nowak & Greenfield, 2018b). With 80% of the United States (U.S.) population living in urbanized areas, a more robust understanding of urban forestry and its practice is vital to the 21st century.

Community tree regulations have existed in the temperate forest region of North America longer than the United States has existed, with documentation dating back to the 1600s (Kuser, 2007; Hastings, 1921). In 1896 the City of Philadelphia hired their first professional arborist, and Massachusetts legislated the establishment of municipal Tree Wardens – an individual responsible for the care and protection of urban trees (Kuser, 2007; Ricard, 2005; Harper 2017).

In the United States, urban tree canopy cover has decreased by approximately 1% (175,000 acres) annually. That equates to an annual economic loss of USD 96 million (Nowak & Greenfield, 2018). Funding for urban and community forestry at the state level has decreased, and federal support for urban and community forestry activities has not kept pace with mounting costs (Hauer & Johnson, 2008).

Volunteers account for a significant amount (5%) of municipal tree care performed in the United States (Hauer, 2018). Volunteers often engage in tasks varying from installing to maintaining (i.e., watering, pruning) urban trees (Fazio, 2015). They also participate in urban forest inventory initiatives that include data collection (Bloniarz & Ryan, 1996). Volunteers educate fellow community members and advocate before

local government officials on behalf of the urban forest (Harper, Huff, Bloniarz, DeStefano, & Nicolson, 2018).

Volunteers in urban forestry are often organized via a committee or NGO. However, there is a limited understanding of many of these entities. Some entities arise out of an urban forestry-related emergency or disaster (e.g., an invasive insect, weather event), but insights into their history, organizational structure, funding, partnerships, and programming would be beneficial for communities that aspire to establish their own organization as a means of leveraging volunteer services (Elton, Harper, Bullard, Griffith, & Weil, 2022).

The complex relationship between these social and environmental factors present within urban forests inspired me to conduct the following research for this thesis: (Chapter 1) a literature review related to volunteerism in urban forestry in the United States; (Chapter 2) the development and dissemination of an electronic qualitative survey aimed at better understanding the characteristics, activities, and attributes of urban forestry NGOs throughout the temperate forest region of the United States.

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CHAPTER 1

VOLUNTEERISM IN URBAN FORESTRY IN THE UNITED STATES

Abstract

This chapter presents the results of a literature review related to volunteerism in urban forestry in the United States. The themes explored were inductively emergent from the research reviewed and included 'volunteer demographics', 'motivations of volunteers', 'benefits of volunteering', 'volunteer engagement and barriers', 'value of volunteering', 'accuracy and reach of tasks performed by volunteers', and 'volunteer recruitment and retention'. Urban forestry volunteers are often motivated by personal, social, and environmental considerations. Volunteers in urban forestry may not be representative of a cross-section of the communities that they are serving, rather they are often middle-aged, well-educated White women. Volunteers in the United States account for 5% of municipal tree care in urban forests – accounting for an estimated $35 million USD in value. Volunteers perform critical urban forestry-related tasks that aim to increase urban tree canopy cover through tree selection and planting efforts. Volunteers encourage urban tree survival by advocating for, as well as performing, important maintenance-related duties including the administration of supplemental watering and urban tree pruning. With proper training and support, volunteers may accurately perform important data collection efforts that may inform management decisions and urban tree care maintenance programs. Further research is required both to ascertain barriers to volunteerism and to enhance future volunteer recruitment and retainment efforts.

Introduction

The urban forest may be defined as all woody plants and vegetation in and around dense human settlements, such as street trees, residential trees, park trees, and greenbelt vegetation (Miller, Hauer, & Werner, 2015). Urban forestry was first defined by Professor Eric Jorgensen, University of Toronto (1970):

> "Urban Forestry is a specialized branch of forestry and has its objective the cultivation and management of tress for their present and potential contributions to the physiological, sociological, and economic well-being of urban society. These contributions include the over-all ameliorating effect of trees on their environment, as well as their recreational and general amenity value" (pp.43a-51a).

More recently, a content analysis of 58 urban forestry definitions found that that urban forestry can be summarized into six categories: People, geography, benefit, resource, activity, and science (Brown, 2007; Miller et al., 2015). With 80% of the United States (U.S.) population living in urbanized areas, urban forests are the contemporary forest-types with which most Americans are familiar. Urban forests provide important services by reducing structural cooling costs, stormwater runoff, and noise pollution; by enhancing property values, wildlife habitat, and biodiversity; and by providing positive emotional and spiritual experiences for citizens and residents (Bosci, Warren, Harper, & DeStefano, 2018; Nowak & Greenfield 2018; Peckham, Duinker, & Ordonez, 2013; Roy, Byrne, & Pickering, 2012).

Concerningly, urban tree canopy cover (UTCC) has been decreasing in the conterminous U.S. (~1.0% total from 2009 - 2014), while impervious cover has been increasing (~1.0%) (Nowak & Greenfield, 2018). Although a 1.0% decrease may seem

minimal, it equates to the annual loss of approximately 36 million trees (the equivalent of 175,000 acres), and an annual economic loss of urban forest benefits conservatively estimated at $96 million USD (Nowak & Greenfield, 2018). Furthermore, funding for urban and community forestry at the state level has also decreased, and although federal support for urban and community forestry activities has increased, a majority (58.9%) of state urban and community forestry coordinators believe that the total funding has not kept pace with mounting costs and should be increased further (Hauer & Johnson, 2008).

Though legislation and regulations designed to advance urban and community forestry practices and promote urban forest sustainability have increased in recent years (Hauer & Johnson, 2008), policies and ordinances have actually been in effect for several centuries in the U.S. Hastings (1921) described a law originating in 1633 that prohibited the wanton felling of trees that lined the path from Cambridge to Charlestown, Massachusetts. According to this ordinance, violators would be fined five shillings for every tree removed (Hastings, 1921). In 1807, Michigan Territory law specified the installation of trees as it was thought that they would be an important component of providing a healthier environment for citizens – one of the same reasons why cities plant trees today (Hauer, 2018). In 1896, Massachusetts state law enabled municipalities to appoint the first urban forestry officials responsible for the management of trees in the public right-of-way, known as municipal tree wardens. In 1899 their appointment was mandated at the community level (Harper, Bloniarz, DeStefano, & Nicolson, 2017; Miller et al., 2015; Ricard & Bloniarz, 2006). Research interviews conducted over multi-

year period with tree wardens demonstrated that these professionals routinely interact with citizen volunteers engaging in urban forestry-related activities (Harper et al., 2017).

Volunteers account for a small (5%), yet significant amount of municipal tree care performed in the United States (Hauer, 2018). According to Roman et al. (2018), members of the public play a valuable and multi-faceted role in stewarding and studying urban trees and green spaces. Volunteers often engage in a variety of tasks that include installation and maintenance practices (i.e., watering, pruning) relating to urban trees (Fazio, 2015). They may also find themselves participating in a suite of duties related to urban forest inventory initiatives that include critical assistance with data collection (Bloniarz & Ryan, 1996). Volunteers may also educate fellow community members and advocate before local government officials on behalf of the urban forest (Harper, Huff, Bloniarz, DeStefano, & Nicolson, 2018).

A committee that volunteers may find themselves routinely participating in – and even initiating the formation of – is a local tree board. Tree board volunteers may act in an official capacity on issues pertaining to the management of their urban forest (Harper et al., 2018). Though tree board volunteers are routinely tasked with the care of trees located in urban streets and parks, they may also find themselves concerned with the management of urban trees found growing on private properties. This is an important consideration since trees growing on private landscapes may comprise up to 90% of the urban tree canopy cover of a community (Fazio, 2015). Whatever the setting, the

volunteers that comprise tree boards endeavor to “reflect the will of the community” (Fazio, 2015) and balance the needs of urban trees with the resources of the municipality.

Regardless of the task, volunteer contributions to the urban forestry sector are increasingly important in this era of austerity. With this in mind, the following literature review synthesizes the current state of knowledge regarding urban forest volunteers. It also calls attention to areas requiring further investigation and research, including the need to better understand urban forest nongovernmental organizations (NGO’s) that develop programs utilizing volunteers, the potential success rate of urban trees stewarded by volunteers, and further details related to better understanding the subtleties and nuances of volunteer motivations. Information related to the detriments or perceived detriments of utilizing volunteers in the urban forest is also included in this review.

Methods

A total of 185 research articles regarding urban forest volunteers were reviewed and compared, predominantly from four major urban forestry journals: Arboriculture & Urban Forestry (AUF) (formerly known as the Journal of Arboriculture), Urban Forestry & Urban Greening (UFUG), Cities and the Environment (CATE), and the Arboricultural Journal. Articles were identified in the University of Massachusetts library research database, the United States Forest Service TreeSearch database, and the International Society of Arboriculture research database. Emphasis was placed on articles within the discipline of urban forestry that featured a qualitative discussion of volunteerism. Textbooks, web-based industry resources, professional white papers and government

reports were also reviewed. These resources were searched using the key word phrase "urban forest" "urban forestry" and variations of the keyword "volunteer" including "volunteering" and "volunteerism". The following themes were emergent from the literature reviewed and formed the outline for this review: volunteer demographics, motivations of volunteers, benefits of volunteering, volunteer engagement and barriers, value of volunteering, accuracy and reach of volunteer work, and volunteer recruitment and retention.

Volunteer Demographics

Community-wide citizen engagement initiatives that incorporate participation from volunteers should involve individuals that reflect and represent the community (Locke & Grove, 2016).

In contrast, volunteer efforts involving urban tree planting and citizen science tree inventories have historically incorporated limited, non-representative subsets of the urban population (Martinez & McMullin, 2004). Urban forestry volunteers tend to be well-educated, middle-class White women with full-time employment (Asah, Lenentine, & Blahna, 2014; Guiney & Oberhauser, 2009; Still & Gerhold, 1997). They are also more likely to own their home and have lived in their city for at least a decade (Locke, Roman, & Murphy-Dunning, 2015; Summit & McPherson, 1998), but perhaps substantially longer (Still & Gerhold, 1997). These findings align with conclusions from Johnson et al. (2018), who formally examined participant demographics of volunteers who partook in New York City's TreesCount! street tree census. Most of these participants were also found to likely be higher income-earning, well-educated, White females (Johnson,

Campbell, Svendsen, & Silva, 2018). Still & Gerhold (1997) found that 35% of volunteers featured a household income of $50,000-$99,999, and 28% had a household income of $30,000-$49,000. These findings were consistent with conclusions from a study by Guiney & Oberhauser (2009) who examined the relationship between volunteers and household income. Zhang, Hussain, Deng, & Letson (2007) determined that individuals who were more likely to donate time or money to community forestry programs were employed full-time and earned more than $75,000 in annual income. Other groups, however, are also represented; Guiney & Oberhauser (2009) found that individuals making less than $30,000 did actively volunteer – but at a much lower rate (13%) than individuals from other income brackets. Both Guiney & Oberhauser (2009) and Still & Gerhold (1997) found a positive relationship between education and volunteerism in urban forestry volunteer initiatives, concluding that approximately 75% of their study participants had completed college. It is important to note that one study (Moskell, Allred, & Ferenz, 2010) identified that only half of urban forestry volunteers surveyed were White, suggesting that racial and ethnic composition of volunteers may feature a degree of diversity that is worthy of further formal exploration. Though opportunities to expand volunteer involvement from more varied groups abound, further research is needed to identify barriers to participation among marginalized communities (Johnson et al., 2018; Roman et al., 2018) in an effort to create a cohort of volunteers that more accurately represent the communities they serve.

Certain age-groups are also disproportionately represented among urban forestry volunteers, especially those who are in their mid-30s or older. Still & Gerhold (1997) reported that approximately half of urban tree organization volunteers that they surveyed

in New York City and Philadelphia were ages 35 to 50, and only 13% of volunteers were younger than 35. Asah & Blahna (2013) also reported that more than half of their study participants were over the age of 40. In contrast, Moskell et al. (2010) found that half of the volunteers that participated in their study were ages 18 to 24, but this difference was reflected due to the presence of school groups. Still and Gerhold (1997) found that few students (2%) participated in urban forestry volunteer initiatives and events. Families, however, tended to volunteer in urban forestry activities when they included their children, especially youth under the age of five, often as part of a family outing (Greene et al., 2011; Schwarz et al., 2015).

Motivations of Volunteers

The motivations of volunteers have been studied extensively, relative to other topics (see Table 1). A study of the Chicago-based Openlands Project's TreeKeepers program was conducted using surveys, interviews, and participant observations, with the objective of discovering what motivates people to volunteer for urban forestry initiatives. TreeKeepers program was initiated in 1991 to develop and train tree care volunteers in Chicago. The study concluded that volunteers associated with this organization were highly motivated by the emotional, aesthetic, and spiritual values associated with community trees (Westphal, 1993). To better understand who the volunteers of urban forestry NGOs in New York city and Philadelphia were and what motivated them, Stihl & Gerhold (1997) employed mail-based surveys and concluded that respondents' desire to improve their neighborhoods was most important, followed by the desire for acquiring more education and social interaction, respectively, as part of their volunteer experience. Volunteers found that doing "tree care" and tree planting provided the greatest personal

satisfaction, compared to other tasks (Stihl & Gerhold, 1997). These findings were corroborated by Johnson et al. (2018) who employed surveys and interviews from volunteers involved in New York city's TreeCount! initiative. Moskell et al. (2010) conducted on-site surveys of volunteers and focus groups of urban forestry practitioners who participated in the MillionTreesNYC program. They determined that volunteers were driven by a number of motivations that ranged from helping their neighbors to helping the environment. Some volunteers participated, however, simply out of a personal passion for planting trees (Moskell et al., 2010).

Asah & Blahna (2012, 2013) surveyed volunteers in the Seattle-Tacoma metro area, to ascertain motivations and commitment to urban conservation volunteerism. Their research availed six motivational factors including: environmental concerns, well-being of the community, opportunities associated with learning and career advancement, to escape the day-to-day routine and get exercise, to socialize, and to defend and enhance their egos (Asah & Blahna, 2012, 2013). Wall et al. (2006), determined that volunteer motivations can be examined – and even explained – through an econometric lens. They posited that a state's working population (%), the income level, forested land (%), dominant political affiliation, state government expenditures on education, and the number of communities participating in urban and community forestry programs help explain volunteer participation rates among the general public. They concluded that urban and community forestry program recruitment efforts should focus on middle-aged individuals and strive to engage additional communities when possible (Wall et al., 2006). According to Johnson et al. (2018) NYC TreesCount! volunteers indicated that

they were volunteering as an exercise of their personal values, out of a desire to contribute and give back, and to learn new skills and gain further education.

Overall, volunteer motives are varied and include a number of different aims, both personal and public. Notably, across many of the studies there is a reflection on the greater good of the community – specifically concerns related to the environment and about keeping local spaces livable (Asah & Blahna, 2013; Asah et al., 2014; Locke et al., 2014). Generally, future efforts can leverage these two broad trends, while also identifying the specific interests of the local community that will motivate volunteers to stay active.

Table 1. Summary of motivations of volunteers in urban forestry and urban greening.

Motivation	Description
Personal/Psychological	Feel less guilty, making a demonstrable difference, contribute, gain satisfaction, have fun, feel good, see fruits of labor, feel needed, advocating for their values, fulfill duty, make world a better place, emotional or spiritual considerations, volunteering is necessary, boost self-esteem, be part of a cause, have volunteered in the past, grow as a person, beautify neighborhood, values[1, 2, 3, 4, 5, 9, 13, 14,]
Aesthetic/Functional	Replace lost trees, needed trees, want shade, get fruit, add privacy, beautify neighborhood[7, 1, 13, 14]
Educational	Learn new knowledge or skills, sharpen mental acuity, teach others, model a stewardship ethic, share knowledge, apply skills, fulfill class requirements[1, 2, 3, 4, 5, 11, 13]
Social	Demonstrate care, connect with community, make a difference, give back to community/others, socialize with new people, socialize with neighbors, enjoy experience, ensure environment for future generations, see friends, work with a team, help others do something important, support organization, participate in community service[1, 2, 3, 4, 5, 7, 9, 10,11, 12]
Recreational	Get out of house, get away, exercise, get fresh air, enjoy outdoor work, prevent or protect against bad habits, enjoy as hobby[1, 2, 3, 4, 5]
Environmental	Protect, make sustainable, restore, give back to it, enhance, feel connected, help wildlife, love nature, being close to nature, create ecosystem services, fulfill need for more trees[1, 2, 3, 4, 5, 7, 9, 12, 14]
Economic	Give time than money, accept free tree, save on energy costs, add value to property, incentivized[3, 7, 13, 14, 15]
Skills/Professional Development	Gain job possibility, learn job skills, learn about organization, learn about work, network, build resume[1,2,3,5]

Literature cited: [1]Asah & Blahna, 2012; [2]Asah & Blahna, 2013; [3]Asah et al., 2014; [4]Bramston et al., 2011; [5]Guiney & Oberhauser, 2009; [6]Johnson et al., 2018; [7]Locke et al., 2014; [8]Mincey & Vogt, 2014; [9]Moskell et al., 2010; [10]Pike et al., 2020; [11]Shwartz et al., 2012; [12]Still & Gerhold, 1997; [13]Summit & McPherson, 1998; [14]Summit & Sommer, 1998; [15]Westphal, 1993.

Benefits of Volunteering

Volunteers often indicate that the social benefit(s) derived from community-based volunteering are highly meaningful. Westphal's Chicago-based study (2003) concluded that education, crime, safety, and the local economy can all be impacted positively by the activities of volunteers, and that they are most effective when they are directly associated with community beautification:

> "…no one will say 'we need to plant more trees to reduce stress and raise our cognitive functioning,' but they might say 'this place brings you down. We need more life here, more color!'…" (p.144).

Another Chicago-based study produced at the same time examined the social benefits of urban forests at the individual level. Kuo (2003) concluded that "informal social contact among neighbors" is critical in the development of person-to-person "social ties," and that trees themselves may be an important cohesive factor pertaining to social contact among neighborhood residents (Kuo, 2003). Elmendorf (2008) echoed this sentiment, concluding that

> "tree plantings and other civic environmental projects can be used to promote both healthy environments and healthy social structure even in the most deteriorated neighborhoods" (p.152).

According to Hansmann et al. (2016) urban forestry and community-based natural resource initiatives have the potential to "nurture" relationships between different stakeholder groups, conceivably developing social capital and building capacity. Watkins et al. (2017) also found a statistically significant relationship between urban tree planting and the strengthening of neighborhood ties. Tree planting, after all, is viewed as an

actionable way that community volunteers and professionals can make a discernible impact on the community. Lipkis & Lipkis (1990) summarize these sentiments:

> "Tree planting…can build the bridges and promote the understanding that brings the neighborhood together. The initial efforts of the tree planters compound themselves as others find in the trees a deeper appreciation of the community as well as natural beauty. It is the beginning of the formation of new values that is the foundation for city-wide transformation" (p. viii).

To explore in depth the attraction between people and trees, Dwyer et al. (1991) employed intercept interviews of visitors at the Morton Arboretum, in Lisle, IL. They summarized that urban trees are living, breathing organisms with which people form a "strong relationship".

Volunteer Engagement and Barriers

Volunteer opportunities may provide citizens and residents with an enhanced awareness of, and engagement with, community greening initiatives. In Detroit, Michigan, resident volunteers' involvement in tree planting and maintenance were investigated with interviews and a survey (Austin, 2002). Researchers concluded that interactions between forestry professionals and the public can be more positive through increased efforts to understand the urban audience (Austin, 2002). According to Moskell et al. (2010) urban forestry practitioners, from municipalities to NGO's, may organize and be a catalyst for opportunities for stakeholders to become involved. In an article reporting the results of a 2003 statewide survey of South Carolina, U.S., residents investigated the characteristics affecting participation in urban and community forestry programs. To attract potential volunteers not directly related to the forestry industry or community government, a more efficient method of raising awareness was deemed

essential for the continued success of urban and community forestry programs. The primary concern was that many survey participants had no knowledge of the urban and community forestry programs – likely the result of poor publicity (Straka, Marsinko, & Childers, 2005).

Though perhaps surprising to some, not all municipal tree planting programs are well-received. In an investigation performed between 2011-2014, it was determined that 24% of residents offered a street tree in Detroit, Michigan, U.S. submitted a "no-tree request" (Carmichael & McDonough, 2019). The study used transcribed dialogue of community meetings and interviews with city residents, and those within the local urban forestry NGO, The Greening of Detroit, to understand this aversion to tree planting. Reasons indicated were consistent with other bodies of work (Schwarz, Fragkias, Boone, Zhou, McHale, Grove, O'Neil-Dunne, McFadden, Buckley, Childers, Ogden, Pincetl, Pataki, Whitmer, & Cadenasso, 2015) where residents identified concerns regarding the maintenance and perceived disservices (i.e., root damage to infrastructure, pruning, and raking leaves) associated with trees. It was concluded that urban forestry related programs – such as community tree planting – should commence with a dialogue between citizens, decision-makers and other stakeholders aimed at first understanding the character of a place according to its inhabitants (Carmichael & McDonough, 2019).

Other barriers to participation in urban forestry-related activities by residents of the community may include availability and knowledge. Individuals have expressed that they do not have enough time to become involved with an urban forestry volunteer-led

effort (Schwarz et al., 2015), or that they already have competing commitments that occupy their free time (Martinez & McMullin, 2004). Residents may also simply not be aware of or fully appreciate the benefits provided by trees, or the support provided by the municipality or a local NGO regarding the ongoing maintenance of a tree (Zhang & Zheng, 2011). Thus, decision-makers should keep in mind that residents are more likely to participate in a volunteer activity if it is short-term endeavor (Schwarz et al., 2015), and efforts should be made to inform citizens about the urban forestry resources available to them (Treiman & Gartner, 2005) at the local level.

Value of Volunteering

At the national level, volunteerism is both an important mechanism through which individuals may give their time, knowledge, and resources to the community around them (Harrison, Franklin, & Mills, 2017), as well as a generator of an estimated $187.7 billion USD in annual value to the U.S. economy (Independent Sector, 2020). Regarding the urban forestry sector specifically, Hauer & Peterson (2016) estimate that Americans annually volunteered almost 1.5 million hours on activities relating to municipal trees. This equates to an estimated value of $35 million USD and amounts to almost 5% of the total time required for tree care in a community. According to Daniels et al. (2014) volunteers themselves bear about a third of the costs associated with an environmental program or initiative, including time, travel, equipment, and salary-related expenses.

As trees mature, increasing in size and stature, their capacity to provide a variety of social and environmental benefits augments substantially (Barro, Gobster, Schroeder, & Bartram, 1997; Berland, Shiflett, Shuster, Garmestani, Goodard, Herrmann, & Hopton,

2017; Lohr, Peterson-Mims, Tarnai, & Dillman, 2004; Scharenbroch, Morgenroth, & Maule, 2016). According to a meta-analysis of street tree survival rates conducted by Roman & Scatena (2011), the population half-life for trees installed in a city street tree pit was found to only be 13–20 years. Overall street tree life expectancy was determined to be 19–28 years (Roman & Scatena, 2011). Though longer than previous survival estimates of 7 or 13-year average life spans, (Moll, 1989; Skiera & Moll, 1992), current understanding of urban tree life expectancy remains well below life expectancy projections of trees growing in undisturbed, forested settings, and well below tree size potential. An economic study of urban forest survival and growth revealed that the energy-saving benefits conferred by long-term planting programs in the city of Sacramento, California fell substantially short of the projected savings values in association with higher than expected tree mortality rates (Ko, Lee, McPherson, & Roman, 2015). Volunteers, however, may contribute to the economic and environmental capacity of the urban forest by increasing tree survival and fostering tree growth and maturation. For example, they may help mitigate these losses by minimizing the variability of post-planting tree care (Allen, Harper, Bayer, & Brazee, 2017; Jack-Scott, Piana, Troxel, Murphy-Dunning, & Ashton, 2013). According to a 2013 study conducted in New Haven, CT, tree survival, growth and longevity were positively associated with installation and maintenance by volunteer-based groups (Jack-Scott, et al., 2013). Similarly, two case studies described by researchers from the US Forest Service and Fairmount Park Conservancy identified a clear uptick in tree establishment, survival, and growth of juvenile urban trees that were planted as part of initiatives in East Palo Alto, CA and Philadelphia, PA. Stewardship was deemed to be critical both in terms of

activities pertaining to tree care, and program processes in place to support those activities (Roman, Walker, Martineau, Muffly, MacQueen, & Harris, 2015). Mincey & Vogt (2014) concluded that group-related tree maintenance activities (i.e. collective watering), formally documented maintenance activities (i.e. signing watering agreements), and follow-up monitoring contributed positively to behavior and enhanced tree survival. They concluded that their findings may help to

> "improve the guidance offered by municipalities and nonprofits to neighborhoods for the management of successful tree-planting projects, and can ultimately improve the survival, growth, and thereby benefits provided by neighborhood-planted trees" (p. 84).

Breger et al. (2019) examined the stewardship network and survival rates of trees planted in Holyoke, MA, as part of the state-led initiative, Greening the Gateway Cities Program (GGCP). By employing stake holder interviews and surveying newly planted trees for survival, vigor, and planting site type, they concluded that stewardship is essential for ensuring urban tree survival:

> "In the GGCP pilot in Holyoke, trees that were stewarded by local program recipients died at a higher rate than trees stewarded by the state DCR. Trees maintained by local recipients during drought faired particularly poorly. This survival and stewardship differential may be explained by a lack of institutional capacity and misalignment of tree management goals among key actors. Urban tree planting programs may see higher survival if they plan for and fund maintenance of newly planted trees in coordination with municipal government, NGOs, and other local actors" (Breger et al., 2019, p. 8).

A study of New York City's Triangle Below Canal neighborhood found that street trees without stewards were three times more likely to die than trees that received post-planting care and stewardship from volunteers (Boyce, 2010). To increase chances of tree survival, it is important to select trees that have a high tolerance to difficult urban conditions, requiring minimal supplemental care required beyond the time of installation

(Allen et al. 2017). Volunteers may aid in this critical planning stage by researching and collecting appropriate urban tree selection resources (McElhinney & Harper, 2019), as well as by working directly with nursery professionals on behalf of the municipality (J. Kinchla, Amherst Nurseries, pers. comm.).

Accuracy and Reach of Tasks Performed by Volunteers

Successful urban forestry-related research and operations require sound data. Volunteers may find themselves assisting with aspects of data collection or coordinating these activities in their entirety. Bloniarz & Ryan (1996) investigated the use of volunteer initiatives in relation to conducting urban forest resource inventories. A street tree inventory was conducted in Brookline, MA, using community volunteers. Each volunteer completed a 12-hour training program led by expert instructors from the University of Massachusetts and the Arnold Arboretum of Harvard University. The training included classroom and practical field instruction. Bloniarz and Ryan concluded that data collected by trained volunteers was valid, and the accuracy compared "favorably" to results from a control group of certified arborists (Bloniarz & Ryan 1996).

A more recent Minnesota-based study aimed to determine the accuracy of volunteer-based data collection and examine the impact of training protocols on data quality and the degree of agreement between volunteer-collected data and data collected by university specialists. Through press releases in community newspapers, volunteers were recruited to participate in data collection as part of performing an urban tree inventory. Volunteers were provided formal training in identifying trees, measuring diameter (DBH) and crown width, as well as assigning a qualitative condition rating.

Researchers concluded that agreement among the groups exceeded 90% in relation to tree identification to the level of genera, and achieved nearly 70% agreement in relation to tree condition rating (Bancks, North, & Johnson, 2018). According to Bancks et al. (2018):

> "The results of this research indicate that trained volunteers can collect urban forest survey data at a higher frequency of agreement with university researchers when provided with appropriate tools and technical assistance" (p. 83).

In 1995, 2005, and 2015 citizen scientists participating in the annual volunteer tree inventory NYC TreesCount! were asked to record the location, size, species, and condition of all public curbside trees. According to Crown et al. (2018), findings indicated that 2015 participants were able to build on the experiences of the 1995 and 2005 inventories, collecting data in an increasingly accurate manner. TreesCount! activities also served to connect like-minded citizen scientists and promote awareness of the importance of the urban forest (Crown et al., 2018). Roman et al. (2017) investigated data quality by comparing street tree data collected from four cities by experts, to data collected by less experienced field crews. Findings indicated that citizen science is a viable option for some urban tree inventory and monitoring projects, particularly if DBH accuracy is required only at coarse precision, and genus-level identification of street trees is acceptable (Roman et al., 2017).

Volunteer forestry efforts have also taken the form of virtual surveys - a "virtual survey" involves recording urban tree data by manually interpreting photos. This approach is similar to vehicular windshield surveys, which involve rapid data collection by a crew driving a vehicle along a street. In one study, urban tree inventory field data

was collected by trained students and then compared with data that was collected by trained volunteers using Google Street View (Berland, Roman, & Vogt, 2019). Researchers concluded that virtual surveys using street-level imagery offer an alternative or complementary approach to field data collection for street tree inventories. In practical terms, these findings point to the use of virtual surveys to efficiently collect high-quality tree location data using volunteers (Berland et al., 2019).

The Forest Health Ambassador Program is a joint public-private initiative of Oakville, Ontario, Canada that recruits volunteers from the community to assess municipal street tree health. In a case study of this program, a volunteer citizen-scientist program was implemented to increase public awareness of urban forest health issues and to gather data on tree health and invasive insects (Barker, Craig, Winmill, Meating, & Karandiuk, 2018). Training volunteers to inspect trees was contracted to a private consultant. The program was designed to achieve three primary goals: increase the capacity for early detection of invasive species, track forest health trends over time, and foster public awareness of urban forest health. The study found that the program demonstrates how a nominal investment by a municipality can effectively extend early detection capability beyond monitoring programs staffed with professionals only (Barker et al., 2018).

Volunteer Recruitment and Retention

Nationally, U.S. volunteer participation rates fluctuate annually and volunteers themselves express concern regarding future citizen volunteer recruitment and retention efforts (Harper et al., 2018). The most effective recruitment efforts may occur by word of

mouth and through the media (Locke et al., 2015; Still & Gerhold, 1997; Summit & Sommer, 1998). Still & Gerhold (1997) noted that half of those asked to join an organization did so because of a direct request and would otherwise not have joined. Thus, recruitment efforts should focus on advertising urban forestry-related events and volunteer opportunities through these channels. Urban forestry practitioners have identified long-term volunteer communication as one of the more successful stakeholder engagement strategies (Moskell et al., 2010). Contact with volunteers in general is important, as communication and participation in decision-making typically increases voluntary commitment (Knoke, 1981). Environmental concern remains a key motivator to many urban forestry-urban greening volunteers, but generally, research has indicated that social and personal motivators are more prevalent in repeat volunteers (Asah & Blahna, 2012). Ryan et al. (2001) also demonstrated that volunteers' motivations change over time, during different stages of participation. The authors found that helping the environment and learning about the urban forest were important initial motivators, while social factors and project organization were significant predictors of volunteer commitment. Thus, ensuring that social and personal benefits are readily understood by participants may encourage volunteers to return and contribute on an ongoing basis (Asah & Blahna, 2012; Summit & Sommer, 1998). Organization leaders should incorporate personal and social incentives, as well as environmental motivators into their advertising efforts and include refreshments and time for socialization (Asah & Blahna, 2012; D. Bloniarz, USDA Forest Service, pers. comm.). Constructing games or friendly competition from conservation efforts may also prove to be a successful way of appealing to volunteers and may increase the number of millennial participants involved in

environmental volunteer work (Asah & Blahna, 2012; Bowser, Hansen, He, Boston, Reid, Gunnell, & Preece, 2013; Summit & Sommer, 1998).

Volunteer involvement and experience may also be improved by emphasizing participant satisfaction. Martinez & McMullin (2004) concluded that perceived efficacy was the most important determinant in volunteers' decision to participate in a nongovernmental organization. The authors suggest that, in order to recruit and retain participants, programs should produce results of which members are proud (Martinez & McMullin, 2004). Ryan et al. (2001) provided similar recommendations regarding the tangible results of volunteer efforts. Likewise, research by Sommer et al. (1994a, 1994b) showed that resident involvement in tree planting lead to improved satisfaction, which bodes well for participant attitudes regarding their volunteer experience.

In their survey of those involved with the Minnesota Master Naturalist program, Guiney & Oberhauser (2009) noted that 98% of participants indicated that they felt moderately to extremely connected to nature, demonstrating the significance of this connection and its relevance in finding future urban greening volunteers. Of their participants, 77% became interested in nature by age 10, and 88% by age 15 (Guiney & Oberhauser 2009). These figures iterate the importance of involving youth in volunteer recruitment efforts. Volunteers surveyed expressed that their interest developed from the influence of family more so than friends, which points to the importance of family-friendly initiatives and programs. Additionally, experiences that were unstructured and located in wilder settings (e.g., camping and observation) than those that were structured

and located in domestic nature (e.g., classes), inspired greater interest (Guiney & Oberhauser, 2009). Peckham et al. (2013) observed a similar response, where volunteers described their wonder for nature when they were surrounded by wilder places. These findings are further supported by the noted environmentalist Rachel Carson, who also posited that unstructured exploration of the wild by youth is what ultimately sparks interest in nature (Carson & Pratt, 1965). Those who did not report being interested in nature until ages 11-19, however, were found to more likely to name a specific class that piqued their interest; this illustrates the critical role of schools and nature programs in fostering a love for the natural world among adolescents (Guiney & Oberhauser, 2009).

A 1996 case study of Chicago fifth graders determined that offering urban greening opportunities to school-age children not only provides benefits to students, such as empowerment and learning, but that it also motivates parents and the community to participate out of their desire to support the students' academic experience (Bouillion & Gomez 2001). Moreover, research has shown that students are more likely to participate in an urban greening initiative if it is directly affiliated with an educational program (Barnett, Lord, Strauss, Rosca, Langford, Chavez, & Deni, 2006). It is promising that, according to McDougle et al. (2011), young adults who volunteer for other types of nonprofit organizations and those who engage in pro-environmental behaviors are likely candidates for future involvement with environmental organizations. They determined that social motivators are the strongest predictors of young adult volunteerism in environmental groups (McDougle et al., 2011). Since research has identified that high school graduates, as well as individuals with some post-secondary education are more

likely to want a tree in their yard, (Donovan & Mills, 2014; Greene et al., 2011; Zhang & Zheng, 2011), this speaks to the overall notion about the importance of, and connection between, education and environmental awareness.

Underrepresented minority populations and low-income individuals, who are often particularly underrepresented in volunteer initiatives in general (Guiney & Oberhauser, 2009), may also represent an important demographic for future volunteer recruitment. A study by Locke & Grove (2016) found that tree planting programs are typically most successful where they are least needed, such as in affluent neighborhoods. Thus, further research is needed to understand how to expand urban reforestation activities to low-middle income communities, which may help address environmental justice concerns and provide the opportunity to elevate volunteer rates among these residents (Donovan & Mills, 2014; Li, Zhang, Li, Kuzovkina, & Weiner, 2015).

Throughout the literature, there was a lack of specificity relative to occupations of volunteers, other than that most volunteers tended to be gainfully employed (Guiney & Oberhauser, 2009; Still & Gerhold, 1997). Future research may be able to determine if there is a link between certain occupations, and interest and frequency in environmental volunteering. Additionally, since researchers also identified private properties as potential sites to expand urban forestry activities and enhance urban tree canopy cover, the relationship between property ownership and citizen engagement in urban forestry volunteer efforts should be further explored (Greene, Millward, & Ceh, 2011).

Discussion and Conclusion

It is estimated that more than 77 million individuals, or approximately one in four American adults, is currently engaged in some form of volunteerism (Independent Sector, 2020). Within the context of urban forestry, volunteers may vary widely relative to work habits, interest-levels, skills-set, and determination (Harrison, Burk, Franklin, & Mills, 2017), yet they are often spurred to action by select key motivational factors: concern for the environment, regard for the well-being of the community, to escape the day-to-day routine and get exercise, to socialize, and out of a passion for trees.

Community volunteers in the urban forestry sector find themselves working at the intersection of interrelated socio-ecological systems (SES) where social elements and human interests like property owners, municipal managers and employees, and policy decision-makers, interact with biophysical factors like trees and urban infrastructure (Harper et al., 2018; Mincey, Hutten, Fischer, Evans, Stewart, & Vogt, 2013). It is in these venues that volunteers may provide essential experience, critical insights and thoughtful perspectives, and in turn benefit by deriving new skills, personal satisfaction and broadening social networks. As the U.S. population continues to age and individuals continue to relocate to more densely populated areas, the social benefits of volunteering in urban forestry-related activities should continue to be investigated. As populations continue to diversify, the sense of community often derived from volunteering may help to build new networks and create a sense of belonging. The simple act of planting a tree – often touted for its environmental benefits – may become increasingly important as a means of fostering neighborly interactions and building social cohesion. Thus, municipal

tree planting efforts may help to build unity among groups of individuals as they rally around a community-wide initiative.

As operational costs continue to increase and municipal budgets continue to be stretched, a heightened emphasis may be placed on the use of community volunteers for urban forestry-related activities. Though short-term labor savings may be realized with the use of volunteers, many important questions remain relative to other expenses. For example, what sorts of costs may be incurred from a liability standpoint? Also, as equipment and technology continue to evolve and demand an increased knowledge base, volunteers will require increasingly sophisticated training. Volunteer support and education requires time and expense from municipal employees, agency specialists and other participants; studies aimed at investigating how these efforts can be conducted most efficiently and effectively should ensue. As industry standards change, the accuracy and validity of volunteer work – and the efforts associated with their training – will continue to need to be examined.

Volunteers in urban forestry are often organized via a committee or NGO; limited understanding exists, however, around many of these entities. Sometimes an urban forestry-related emergency or disaster is part of the genesis of an urban forest committee or NGO, but insights into their history, organizational structure, funding, partnerships, and programing would be helpful for communities that aspire to establish their own organization as a means of leveraging volunteer services.

Relative to other aspects of volunteerism in urban forestry, substantial research has been conducted regarding the motivations of volunteers. These factors, however, are complex and deeply inter-related. For example, the ability to distinguish between the personal desire to acquire a novel skill, rather than the economic desire to build new skills that may advance one's career requires considerable context that may not be readily derived from a survey. Thus methodologies that provide substantial depth of story, such as research interviews or perhaps focus groups, should be further employed to parse out important details and build further understanding relative to volunteer motivations in urban forestry.

The complexity and dynamism behind urban forestry-related activities and operations – including the involvement of volunteers – necessitates regular and ongoing research (Svendsen & Campbell, 2008) into the constellation of organizations and networks of relationships that comprise the urban landscape of the 21st century.

CHAPTER 2

EXPLORING NON-GOVERNMENTAL ORGANIZATIONS IN THE TEMPERATE REGION OF THE UNITED STATES

Abstract

Urban forestry NGOs commenced gaining prominence in the socio-political landscape of the 20th century. Despite a dramatic increase in the number of urban forestry NGOs (50%) in recent decades, they are rarely described in the scientific literature, and they have not been investigated in any formal, systematic manner. Little is known about the origins of many of these organizations or how many formal urban forestry NGOs are presently active across the United States. Knowledge gaps persist pertaining to organizational structure, programming, and funding. To address these gaps, this article presents findings from a survey of 81 urban forestry NGOs in the temperate forest region of the United States. We report on typical traits of urban forestry NGOs across five themes that include 'origin', 'organizational structure', 'funding', 'partnerships', and 'programming'. Nearly 80% of respondents indicated that their urban forestry NGO has helped develop, shape, or implement policy in their community (e.g., tree policies & ordinances, urban forest master plans). An overwhelming majority of NGOs (90% and 83%, respectively) indicated that both private citizens and local departments were important collaborators. A vast majority of respondents (86%) indicated that their NGO routinely engages in planting trees and over 70% of urban forestry NGOs routinely participate in public events including Arbor Day celebrations and local tree giveaways. There is widespread variation regarding the size, composition, and even function of urban forestry NGOs.

Introduction

Benefits of the urban forests have been well-documented in relation to perspectives concerning both the environment (Nowak & Greenfield, 2018a; Nowak & Greenfield, 2018b) and human health (Mei, Malik, Harper, & Jimenez, 2021; Wolf, Lam, McKeen, Richardson, Bosch, & Bardekjian, 2020). In 2001, Nowak et al. concluded that the proper management of urban forest resources may substantially impact the health of residents (Nowak et al. 2001). Following this was the quantification of the benefits of urban trees (e.g., stormwater interception, carbon sequestration) in USD, establishing the urban forest as a valuable community resource (Nowak, 2006). In 2018, Nowak and Greenfield projected urban land area to more than double by 2060 in contrast to a 1% annual decrease in urban forest area from 2009-2014 across the United States. The net decrease translated to a loss of approximately 175,000 acres, with an estimated annual loss of benefits of nearly $100 million USD (Nowak & Greenfield, 2018a; Nowak & Greenfield, 2018b). Given the documented importance of the urban forest, it is no surprise that protecting and promoting its resources has emerged as a clear priority for many communities across the U.S. and around the world (Eisenman, Flanders, Harper, Hauer, & Lieberknecht, 2021).

Urban forestry has a rich history in the United States (U.S.). Community tree regulations have existed in Massachusetts, New Jersey, and Pennsylvania since the 1600s (Kuser, 2007; Hastings, 1921). In 1700, the City of Philadelphia required owners of homes to plant trees, and in 1896 it hired its first professional arborist (Kuser, 2007). That

same year, Massachusetts became the first state to pass legislation establishing the position of the municipal Tree Warden – an individual responsible for the care and protection of urban trees (Ricard, 2005; Harper 2017). In 1966, Georgia was the first state to initiate an urban forestry program and urban forestry was added to the mission of the USDA Forest Service in 1972. The following year, the Commonwealth of Pennsylvania appointed the first state urban forester in the U.S. (Kuser, 2007). The federal America the Beautiful program, enacted as part of the 1990 Farm Bill, continues to provide annual funding to urban forests across the country (Kuser, 2007).) In 2021, President Joe Biden signed into law the Infrastructure and Jobs Act which included a Healthy Streets program putting the power of trees and new infrastructure technology together to reduce the effects of climate change and improve urban neighborhoods. The act also included nearly half a billion dollars for natural infrastructure (e.g., trees) to improve flood and stormwater resilience (Daley, 2021). In the same year, an executive order directed the U.S. to prioritize climate in domestic policy agendas. Following this, he announced the American Jobs Plan, which included funding for the Civilian Conservation Corps, an organization responsible for planting billions of trees across the country (Kranking, 2021). In 1999, the US Forest Service reported that 25% of the U.S. was comprised of urban areas (Dwyer & Nowak, 1999), and posited that:

> "Urban forests can make a considerable difference in the quality of life in a sizable portion of the United States and can directly influence the daily lives of nearly 80 percent of its population" (p.158).

Complementary to governmental initiatives, urban forestry non-governmental organizations (NGOs) have formed across the U.S. with various goals and objectives. In some instances, they may have arisen out of the need to address chronic urban forestry-

related problems that have developed over time, perhaps because of a community's aging and declining tree population (Harper et al., 2018). In other situations, they have been established to address an acute loss of urban tree canopy cover due to a severe storm event or a rapidly invading pest of importance (Harper, 2017; Elton et al., 2020). Some urban forestry NGOs formed in the recent past, while others originated during the Progressive Era of the late 19th century, which saw a blooming of citizen conservation groups (Foster, 2001).

Inspired by J. Sterling Morton's enthusiasm for trees, the first Arbor Day was celebrated in Nebraska on 10 April 1872 (Jonnes, 2016). It is estimated that more than one million trees were planted in the state on that day. Enthusiasm spread across the U.S. and at present, Arbor Day is celebrated in all 50 states (Arbor Day, 2021). Founded in 1972, the Arbor Day Foundation is the largest organization of its kind dedicated to planting trees. With a mission of inspiring people to plant, nurture, and celebrate trees, the Arbor Day Foundation has more than one million members who have helped plant more than 350 million trees in neighborhoods, cities, and forests throughout the world (Arbor Day, 2021). The Arbor Day Foundation is dedicated to restoring forests, improving urban tree canopy cover (UTCC %), and inspiring future generations of tree planters. They support urban forest stewardship with a variety of programs, including the selling of carbon credits through tree plantings, the well-known Tree City USA program that sets minimum urban forest standards for communities, and their Tree Campus K-12 program that works to inspire future generations through experiences with trees (Arbor Day, 2021).

In 1976, Trees New York was founded by concerned residents in response to significant funding cuts in forestry and tree-related services. Throughout its history, the organization has been actively planting trees, conducting stewardship and maintenance activities, and leading educational programs that have trained over 20,000 New Yorkers about the importance of urban forest stewardship (Trees New York, ND). Casey Trees, a Washington D.C.-based organization, was established in 2002 in response to a Washington Post article that chronicled that city's urban forest decline. Casey Trees is dedicated to restoring, enhancing, and protecting the UTCC of the nation's capital. They have established a goal of achieving 40% canopy cover in the district by the year 2032. Casey Trees works towards that objective by planting trees, inventorying city trees, educating residents about the value of urban forests, and advocating for green, tree-friendly development (Casey Trees, 2021).

Massachusetts has a unique history in U.S. urban forestry. Communities in this New England colony were levying fines for the wanton felling of public trees in 1633 (Hastings, 1921), and the first public trees planted were on Boston Common in 1646 (Cowett & Bassuk, 2020). In 1656, Salem, Massachusetts, passed a law requiring permission from a magistrate to remove a public tree (Ricard, 2005). George R. Cook, Superintendent of Parks in Cambridge, Massachusetts, is credited as having first used the term "urban forestry" in the literature, in a municipal report (1894):

> "…systematic official effort is now needed, not only to preserve what we already have; but also to raise the standard of shade tree culture to the requirements of the more cultivated taste which now prevails in the art of urban forestry." "Good taste demands the observance of two rules as essential in street tree planting. First, that

> but one variety of tree shall be planted upon a street, and, second, that the trees shall be planted at uniform distances." (p.73)

It is believed that the first semester-long course in scientific forestry was taught in 1890 at the Massachusetts College of Agriculture (now part of the University of Massachusetts Amherst), possibly titled 'Forestry and Landscape Gardening' (Goodell, 1890; Ricard, 2005). In 1899, the Commonwealth of Massachusetts became the first state to mandate that every municipality appoint a Tree Warden (Ricard, 2005; Harper, 2017).

Today, the urban forestry NGO Speak for the Trees works to improve Boston's urban forest. Focusing on low-middle income (LMI) neighborhoods as well as neighborhoods with low UTCC, they develop and co-create community projects, plant trees, partner with like-minded organizations, and advocate for modern, thoughtful municipal tree policies (Speak for the Trees, 2021). In 2009, the Worcester Tree Initiative (WTI) was organized by local leaders in response to the public outcry from the loss of UTCC due to an infestation of Asian Longhorned Beetle (*Anaplophora glabripennis*) (ALB). When the infestation was identified, the Massachusetts Department of Conservation & Recreation (DCR) instituted a quarantine covering 66 square miles that included the City of Worcester and surrounding communities, intending to restrict the movement of infested wood and to contain ALB (Elton et al., 2020). WTI's original mission was to educate citizens about ALB and the proper planting of trees. It also aimed to provide residents with low or no-cost trees and to ensure that every tree removed due to ALB was replaced with a new planting. Funding for WTI was generated through donations from individual citizens and businesses, and state and federal grants. Having

reached its replanting goal of 30,000 urban trees, WTI continues many of its original programs and has also commenced several new initiatives, including the instruction of young adults about urban forestry and the administration of a volunteer street tree pruning program (Elton et al., 2020).

On 1 June 2011, an EF3 tornado touched down in the City of Springfield, Massachusetts. As a result of this event, 7,500 urban trees were damaged or destroyed (Banacos, Ekster, Dellicarpini, & Lyons, 2012). That same month the local NGO, ReGreen Springfield, formed in response to the urban tree-related damage inflicted by the tornado. At present, ReGreen Springfield works to continuously improve the community through advocacy, tree planting, and environmental education. They emphasize equity and urban forest practices by working directly with LMI populations and environmental justice neighborhoods throughout the city (ReGreen Springfield, 2021).

Though urban forestry NGOs have gained prominence over the decades, they are rarely described in the scientific literature, and they have not been investigated in any formal, systematic manner. Little detail is known regarding the origins of many of these organizations or even how many formal NGOs are presently active in the U.S. Knowledge gaps pertaining to organizational structure, programming, and funding also persist. Finally, the nature of working in an urban environment demands cooperation and collaboration; nevertheless, there is a dearth of information related to the nature of the relationships between urban forestry NGOs and key community partners, including

municipal foresters/Tree Wardens, agencies, the business community, and other local organizations.

Our broad goal in this chapter is to establish baseline information relative to urban forestry NGOs regarding their 1) origin stories, 2) organization and structure, 3) funding arrangements, 4) programming activities, 5) relationships with collaborators, 6) citizen participants and volunteers. This research will help inform future research and practice that can be employed by communities interested in establishing their own urban forest NGO, or by existing urban forest NGOs interested in expanding or improving their organizational operations.

Methods

Survey design

The authors composed and disseminated an electronic survey to urban forestry non-governmental organizations throughout the temperate forest region of the United States using Qualtrics (Qualtrics, Provo, UT). Survey questions were designed following Dillman et al.'s fundamentals of writing questions. Guidelines with the underlying idea to get into a respondent's state of mind (2014). Thirty-two questions were written with the primary objective of better understanding the characteristics of existing urban forestry NGOs. The secondary objective of the survey was to collect information that could be used by communities interested in establishing their own urban forestry NGO and for existing urban forestry NGOs that may be interested in improving, focusing, or expanding current practices. Questions were separated into categories titled 'origin',

‘organizational structure’, ‘funding’, ‘partnerships’, and ‘programming’. The survey was piloted with subject-matter experts that included state urban forestry coordinators and academic specialists in urban forestry.

Six questions asked participants to report their organization’s origin, including the year the organization was founded, the mission statement, and motivation for founding. Fourteen questions asked participants to report the organizational structure of their organization, including their geographic focus, types of marketing, operational guidance (i.e., annual plan of work, budget) being utilized, their non-profit status, details regarding their paid staff, and participation by volunteers. Three questions asked participants to report the funding of their organization, including annual budgets and funding sources. Four questions asked participants to report the partnerships of their organization, including the importance of stakeholders as partners/ collaborators, quality of relationships with local, state, and federal agencies and officials. Six questions asked participants to report the programming of their organization, including the types of programs. Where and whom their programs focus on and the means of evaluation. What programs do the organization utilize to stay up to date on urban forestry practices and research, who is participating, and where programs focus within their community.

The majority of questions (8) were closed nominal. The question types of partially closed nominal and open-ended, each accounted for seven (7) of the survey questions. There were six (6) closed ordinal questions and four (4) partially closed nominal questions. Eleven (11) questions were partially closed, either nominal or ordinal, due to

"Other, describe:" as an answer option. The unipolar, ordinal scale stem "Very___," "Moderately," Slightly___," and "Not___," was used for five (5) questions. "Excellent," "Good," "Fair," and "Poor" were used as responses to three (3) other questions.

Survey distribution

Surveys were sent to NGOs in the following 30 states: Alabama, Arkansas, Connecticut, Delaware, Georgia, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, South Carolina, Tennessee, Vermont, Virginia, West Virginia, and Wisconsin. Organizations were selected in four ways: (1) state urban forestry coordinators were contacted and asked to provide a state-wide list of local urban forestry NGOs, (2) a list of urban forestry NGOs was derived from the Arbor Day Foundation's Alliance for Community Trees program (3) a municipality's name paired with Internet keyword search terms that included "volunteer, tree" to identify if an NGO was present in that community, and (4) NGO representatives that completed the survey were asked to provide contact information for other organizations they thought would be suitable research participants.

The survey was initially disseminated on 27 January 2021, using methods outlined by Dillman et al. (2014) to the identified point of contact in each urban forestry NGO. It included three messages: (1) an introductory email sent 27 January outlining the research and objectives, featuring a link to the actual survey, (2) an email reminder sent two weeks later (9 February), to non-respondents, (3) a final email reminder sent four weeks after the first distribution (23 February), indicating that the survey deadline had

been extended by an additional week. During this first round of data collection, contact information from additional NGOs was obtained from participants through snowball sampling (Sexton, Miller, & Dietsch, 2011). The second sequence of survey dissemination occurred on 9 March, to this new cohort of contacts. In like manner, two reminder emails were sent to non-respondents at 2-week and 4-week intervals (22 March and 13 April), respectively.

Results

One hundred and sixty urban forestry NGOs from 30 states across the temperate eastern United States were invited to participate in this research. Eighty-one organizations responded from 27 states (a 50.6% organizational response rate that represented 90% of the states contacted). Responses were evenly dispersed regionally across the temperate forest area. Twenty-two (27%) responses were from the Mid-Atlantic, 21(25%) from the Southeast, and 19 (23%) each from New England and the Midwest (Figure 1). Individual states with the most responses included Massachusetts (14), North Carolina (7), and Virginia (10).

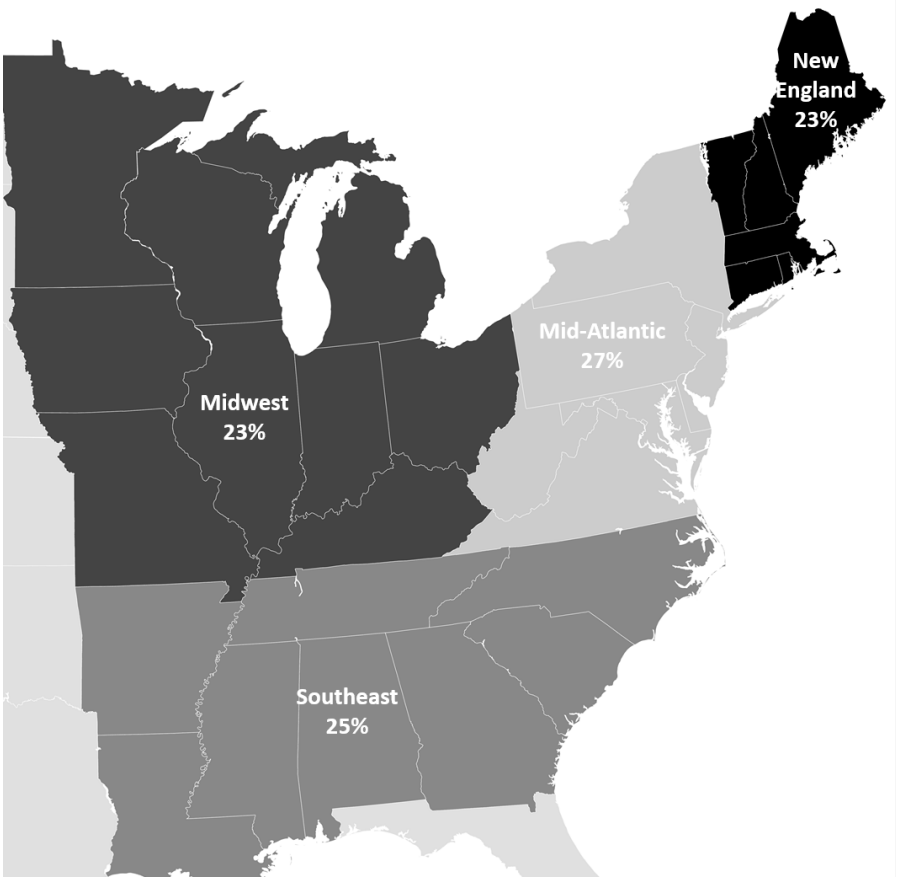

Figure 1: **Distribution of study participants by region.**

Origin

Urban forestry NGOs that participated in this research were established between 1827 and 2019, with the majority of the organizations being established after 1990 (see Figure 2). Only one organization was established before 1970.

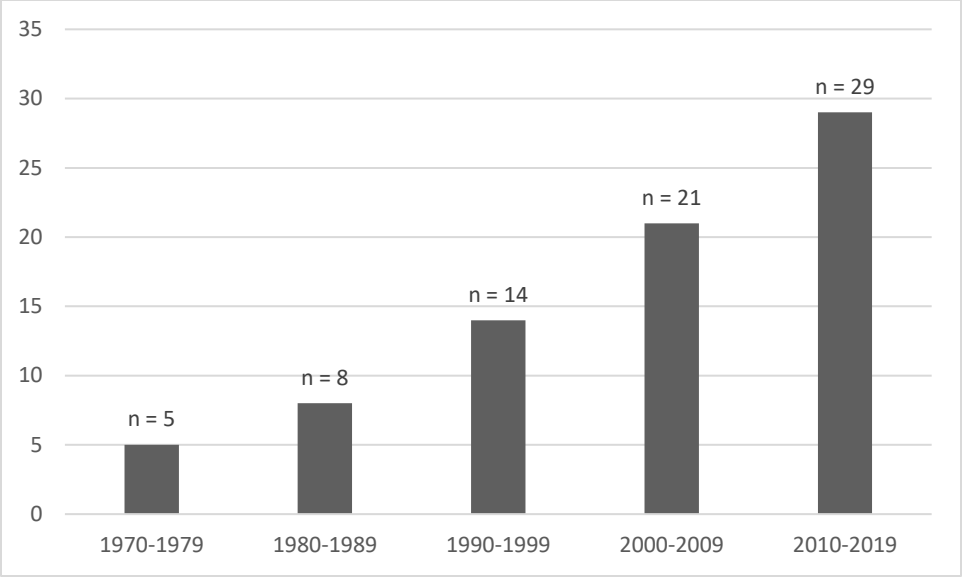

Figure 2: **Establishment of urban forestry non-governmental organizations.**

Over 90% of urban forestry NGOs have a mission statement. The organizations' mission statements were coded to identify the central themes of 'planting', 'community', 'advocate', 'education', 'protect', 'preserve', and 'equitable.'

Nearly a quarter (24%) of urban forestry NGOs indicated that they formed to enhance limited municipal resources. Eighteen percent of organizations were formed to improve UTCC. Acute events or emergencies (i.e., weather, invasive pest) were attributed to 8% of organizations being formed. Interest in neighborhood improvement inspired the genesis of 6% of organizations; climate change mitigation was the catalyst for the formation of 5% of NGOs. Preserving historic trees motivated the formation of 4% of urban forestry NGOs; tree planting and receiving state and federal funds represented the inspiration behind the formation of 3% of the organizations.

In response to a question about engagement of "stakeholders with the formation of your urban forestry NGO?", the following groups were noted as being "moderately" or "very" engaged: a resounding 90% identified private citizens, nearly 60% reported local forestry/urban forestry departments, 50% reported neighborhood organizations and the local mayor/municipal manager, 40% of organizations reported local parks departments, private arborists/contractors, and civic organizations, and more than 30% of respondents identified local public works/streets/transportation departments (see Figure 3).

Fourteen percent of respondents found that federal agencies (i.e., USDA Forest Service) were "very" or "moderately" engaged in their formation, a fifth (22%) were "very" or "moderately" engaged with the University Cooperative extension system, and 31% of organizations were "very" or "moderately" engaged with a state agency.

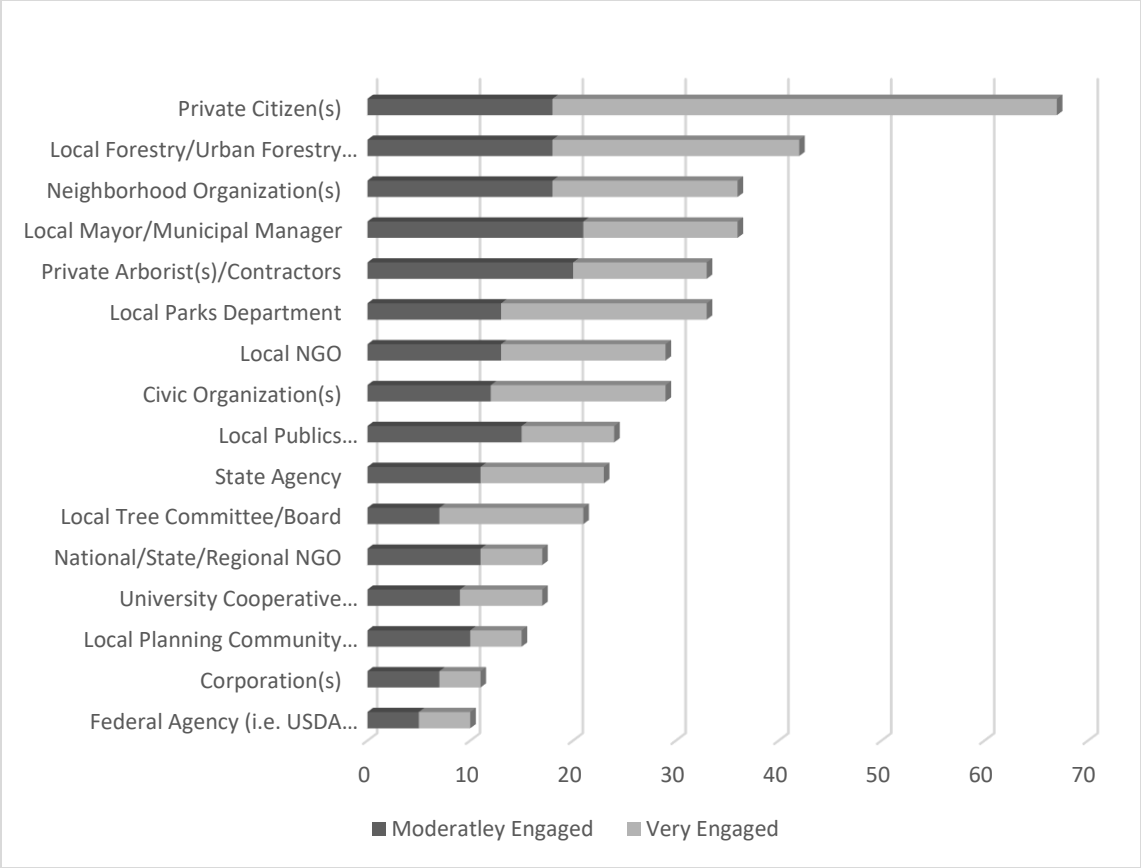

Figure 3: **Importance of stakeholder groups and the formation of urban forest NGOs.**

Organizational Structure

Over two-thirds (70%) of urban forestry NGOs emphasize local issues and work in a local jurisdiction; 85% of NGOs were determined to be registered non-profits. More than half (54%) of urban forestry NGOs feature paid staff, ranging from 1 to 70 individuals per organization, with an average of more than nine employees. Over one-third (35%) of urban forestry NGOs identified having an International Society of Arboriculture (ISA) certified arborist on staff.

When asked, "What sort of operational guidance (i.e., annual plan of work, budget) does your organization have?" a quarter (25%) of organizations responded that

they draft an annual budget; 23% of NGOs take direction from a board of directors, 19% of the respondents indicated that they have an annual plan of work, and 14% have strategic plans. A local forestry division, the local government, and state agencies were reported as providing another source of operational guidance.

Funding

Fifty percent of organizations have an annual budget that is less than $50,000. Participants responded that annual budgets greater than $100,000 account for 49% of urban forestry NGOs. More than 20% of organizations have budgets greater than $500,000 annually.

When asked, “How important are the following to funding?”, 71% of urban forestry NGOs responded that private citizens were “very” or “moderately” important; more than 50% reported private foundations, state agencies, and corporations to be “very” or “moderately” important. Forty-four percent of participants identified local mayoral/municipal manager budgets and local forestry departments as “very” or “moderately” important. Surprisingly, more than 55% of organizations consider federal agencies (i.e., USDA Forest Service) “not important” to funding (see Figure 4).

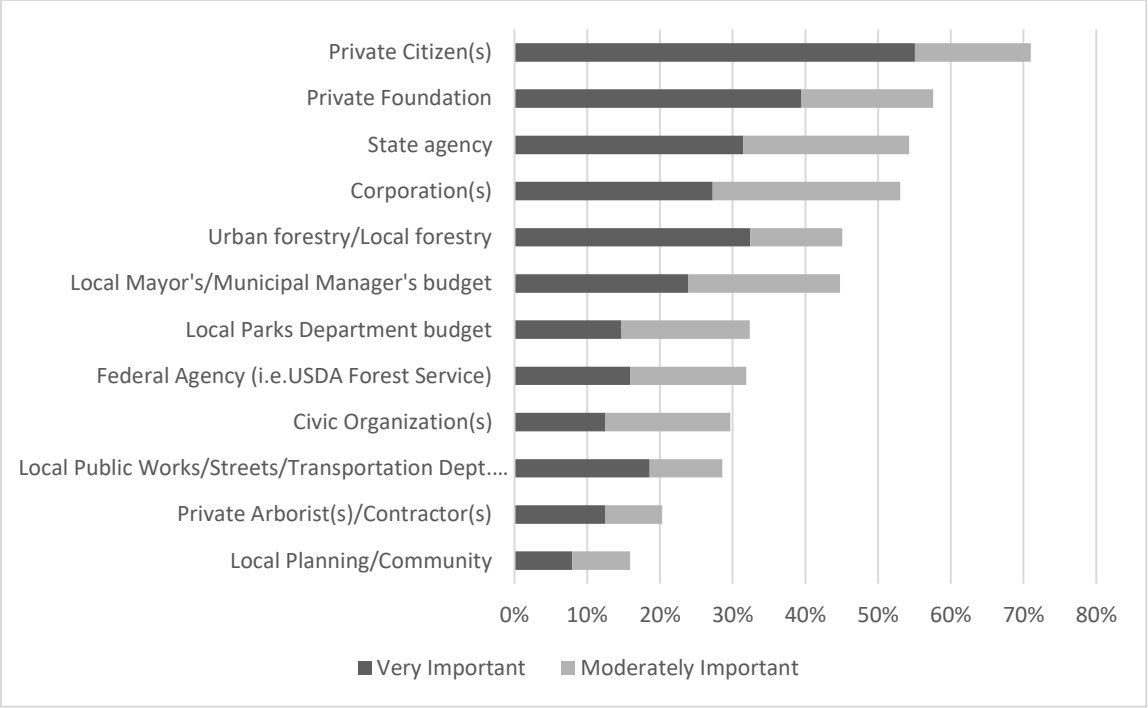

Figure 4: Importance of funding relative to urban forest NGOs.

When categorizing funds that participants receive, 20% identified donations. Grants and fundraising follow with 19% and 15%, respectively. Less than 6% of organizations identified receiving any sort of municipal funding (see Figure 5).

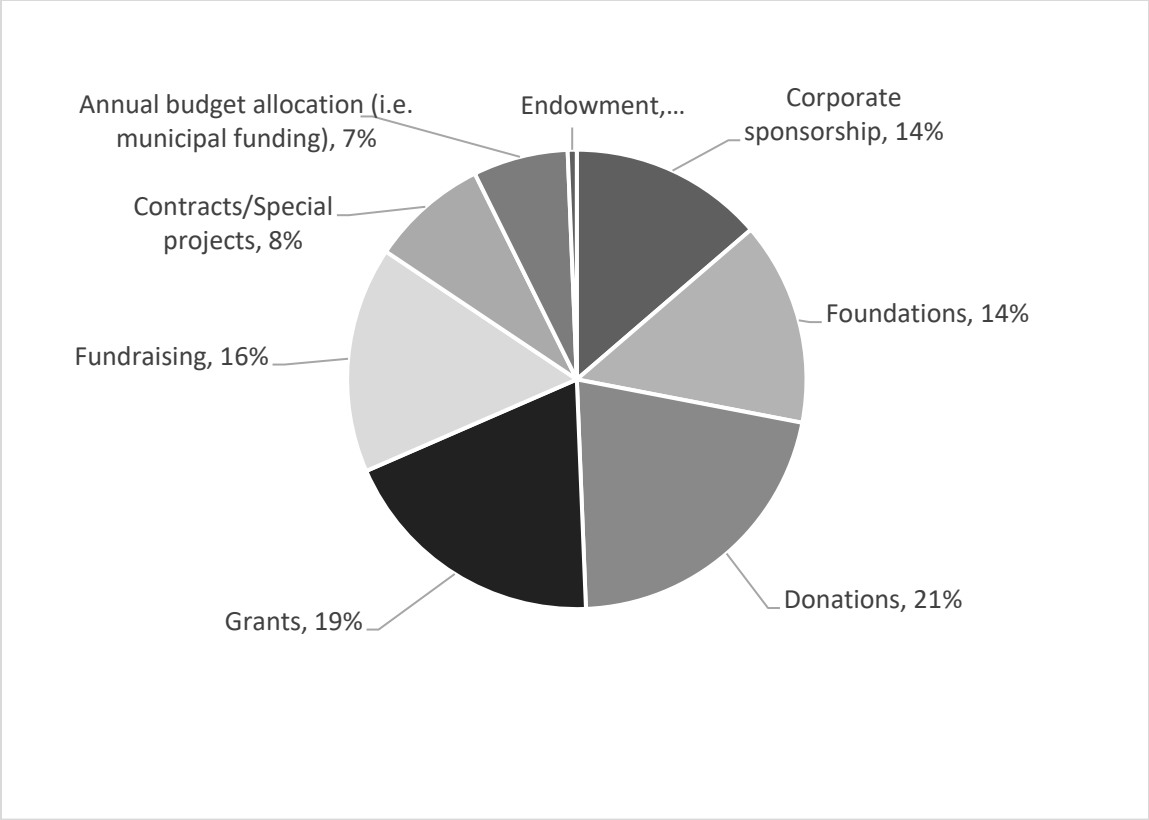

Figure 5: **Urban forestry NGO funding sources.**

Programming

Responses indicated that nearly 80% of NGOs have helped develop, shape, or implement policy in their communities. Descriptions that were provided were coded into themes. Twenty-seven organizations have established or improved 'tree policies & ordinances', and seven have helped develop, shape, and implement 'urban forest master plans' in their respective community. Five NGOs indicated that they provided leadership relative to the founding or furthering of 'tree commissions' that have been involved in conducting inventories or establishing local initiatives like an 'adopt a tree' program.

More than 40% of respondents indicated that they are routinely pruning trees and teaching adult classes, and that 30% are teaching youth classes. The vast majority of

respondents (86%) indicated that their organization routinely engages in planting trees. More than 70% are routinely participating in public events (e.g., Arbor Day, Earth Day, farmer's markets and local tree giveaways).

When conducting a program that aligns with their mission, NGOs typically focus efforts locally, within the community relative to residential neighborhoods (25%), street trees (24%), city parks (22%), environmental justice areas (19%), and commercial areas (10%). Almost 60% of organizations formally evaluate programs or initiatives using benchmarks from previous years (i.e., # of trees planted, the survival rate of trees planted, # of volunteers, # of hours volunteered, the communities canopy cover).

More than 20% of organizations use social media to market and engage the public. Fourteen percent of organizations utilize newsletters and press releases. Around 10% of organizations market themselves to neighborhood associations as well as at community events.

Participants in urban forestry NGO programs are comprised of individual residents (26%), students from local schools (17%), neighborhood associations (17%), corporate volunteer groups (15%), and other non-profits (15%).

Urban forestry NGOs are endeavoring to stay up to date on urban forestry practices and research by attending webinars (22%), conferences (21%), and workshops (20%), as well as through programs produced by their state extension/land grant

university (17%). They read scientific articles (17%) and look to larger organizations like the Arbor Day program and the Alliance for Community Trees, for guidance. Local municipal arborists and local ISA-certified arborists are also resources that NGO volunteers use to stay updated.

Partnerships

When asked to rate the importance of the following stakeholders as partners and collaborators, a resounding 90% (73) of organizations rated private citizens to be "very" or "moderately" important. Eighty-three percent (62) of participants consider their local/municipal departments to be "very" or "moderately" engaged as partners and collaborators. Around 50% (36-39) of organizations find their state agencies, the Arbor Day Foundation, corporations/private businesses, and civic organizations to be "very" or "moderately" engaged. Private arborists were identified by 38% (27) of urban forestry NGOs as having "very" or "moderate" importance as partners and collaborators.

Most (76%) urban forestry NGOs have "excellent" or "good" interactions with their local tree warden/municipal forester, their local municipal officials (61%) (i.e., mayor's office, select board, councilors), and their state urban and community forestry program (74%).

Volunteers

Virtually all (99%) respondents indicated that they utilize volunteers. Numbers of volunteers range from 1 to more than 11,000 per organization, with a median of 100 and an average of 796. The number of hours volunteered at each organization ranges from 30 hours to 35,000 hours. On average, volunteers contribute 3,282 hours to their urban forestry NGO. Thirty six percent of organizations provide formal training for their volunteers. Twenty percent of organizations recruit volunteers through social media and word of mouth while 19% recruit at public events (e.g., Arbor Day, Earth Day).

Discussion and Conclusion

Urban forestry NGOs are present in communities across the temperate forests of the U.S., with each decade showing an increase in the formation of these organizations. Over eighty percent (83%, *N*=64) of respondents were established after President George H. W. Bush's America the Beautiful program was enacted in the 1990 Farm bill. America the Beautiful increased federal funding for urban forestry to $21 million per year. The USDA Forest Service then created the Urban and Community Forestry Assistance program; in 2019, this program provided grants and technical assistance to 775 communities across all 50 States, the District of Columbia, U.S. Territories, and affiliated Pacific Island Nations (USDA, 2021). The 2000s showed a 50% increase in the number of urban forestry NGOs established (21), compared to the previous decade (14). While proliferation of NGOs in response to federal funding has been apparent, a majority of respondents (55%) indicated that they do not consider federal agencies like the US Forest

Service of direct importance to funding or operational activities. This disconnect is rather troubling since 32 million USD were provided by the federal government in 2019 through the US Forest Service for disbursement to state agencies that then funded local urban forestry efforts within their own jurisdiction (USDA, 2020). Federal-level engagement and education efforts should be directed to local NGOs so that stakeholders and citizens may continue to lobby for federal support for urban forestry.

A critical motivating factor for the formation of the lion's share (42%) of urban forestry NGOs was to both extend limited municipal resources and to improve local UTCC. Since the proliferation of UTCC is largely predicated on the successful growth and maturation of newly-installed trees, as well as the protection of existing populations of urban trees, urban forestry NGOs may play a critical role bridging the gap between local resource shortfalls and the duties required to maintain and foster tree survival and maturation (Boyce, 2010), in the difficult urban environment (Jutras, Prasher, & Mehuys, 2010).

Many of the urban forest NGOs indicated that they operate as grassroots organizations without substantial operational guidance from other established professional organizations. Over 70% of respondents indicated that their NGO did not have a budget, 80% did not have an annual plan of work, 85% did not have a strategic plan, and 75% did not have direction from a board of directors. Only 8% of organizations looked to a state agency or local forestry division for operational guidance. Respondents indicated that they did not seem to be taking advantage of avenues of information

available about urban forestry and arboriculture, with only a fifth of organizations indicating that they attend conferences, workshops, webinars, or other state extension/land grant university programs.

The decentralized nature inherent in the formation of a community-based NGO may foster a more informal operational structure, reinforced by the need to reactively address a broad spectrum of timely issues of local concern (Green & Haines 2016). Guiding bodies like state and local agencies, land-grant universities, and established NGOs of prominence should be prepared to provide education, training, and mentorship relative to budgeting, strategic planning, and professional and organizational development. And though 70% of respondents indicated that their urban forest NGO emphasized operations and activities at the local level, urban forestry NGOs may find it beneficial to seek broader partnership opportunities, such as with state agencies that leverage federal funding to support urban forestry initiatives.

Nearly 80% of respondents indicated that their NGO has helped to develop, shape, or implement local urban forestry-related policy in their community. This has often specifically related to local ordinances and bylaws, and an urban forest master plan. NGOs may require more structure and consistency relative to professional and organizational development, and this is especially true in relation to policy-formation (Harper et al. 2018); thus, concerted efforts should be made to ensure that staff and volunteers associated with NGOs that are involved in policy formation receive pertinent training and guidance. Education and lobbying by local NGOs may prove to be a viable

avenue for the enactment of local legislation that could impact a community's urban forestry-related practices for generations to come. Additionally, since only twenty percent of urban forestry NGO respondents indicated that they recruit volunteers through social media, additional training might also include methodologies pertaining to the use of online platforms.

Of all of the factors impacting the success and viability of an urban forestry NGO, the most consequential may be the private citizen. According to respondents, private citizens were "very" or "moderately" engaged in the formation of 90% of urban forestry NGOs. Urban forestry NGOs themselves (90%) consider private citizens to be "very" or "moderately" important partners/collaborators. Private citizens may give generously of their financial resources, and more than 70% of urban forestry NGOs identified private citizens as being a "very" or "moderately" important funding source. Private citizens may also give generously of their time. As mentioned above, virtually all (99%) urban forestry NGOs responded that they utilize volunteers. Volunteer hours ranged annually from 30 to 35,000 hours per organization. On average, volunteers were found to contribute more than 3,000 hours to their urban forestry NGO. Hauer & Peterson (2016) determined that Americans volunteered almost 1.5 million hours annually on activities relating to municipal trees. That equates to almost 5% of the total time required to care for urban forests, an estimated value of $35 million USD (Hauer & Peterson, 2016). Volunteer duties within urban forestry NGOs may range widely and include working booths at public events (e.g., Arbor Day, Earth Day, etc.), coordinating and participating in tree plantings, and tree giveaways. Volunteers may also conduct and participate in fundraising

events, data collection initiatives (e.g., urban forest inventory; urban tree risk assessment), as well as tree-related maintenance activities like pruning or watering campaigns. Volunteers may also liaise with other critical stakeholders including nursery professionals to select plant material for installation (Elton, Harper, Bullard, Griffith, & Weil, in-press). From school children to community decision-makers, volunteers may also play critical roles on behalf of an NGO, as they work to educate others about the benefits of trees. Volunteer support is crucial to the health of an urban forest, and NGOs are a critical venue for that support (Elton et al., in-press).

Over two-thirds (70%) of urban forest NGOs indicated that their area of operation is local, and the vast majority (83%) (n=62) of survey participants indicated that their local/municipal departments are "very" or "moderately" engaged as partners and collaborators. Thus, the importance of establishing good local working relationships cannot be overstated. Fortunately, most respondents indicated that they have "excellent" or "good" interactions with local entities. This finding is consistent with other studies that explored the relationships between successful urban foresters/tree wardens and local organizations (Harper et al., 2017), and the relationship between urban tree committee members and local stakeholders (Harper et al., 2018).

Urban forestry NGOs vary considerably in terms of size, composition, and even function but these organizations have arisen to a position of more prominence and influence than at any other point in U.S. history. Loosely united by a broad set of shared values that may be expressed in their respective mission statements, urban forest NGOs

often rely on a top-down policy framework of funding and support that commences with the federal government and its agencies – predominantly the USDA Forest Service – and extends to their respective state agency and then to local departments and collaborators. They also rely on the bottom-up energy and interest that starts with the individual: the private citizen that has the vision and passion to start a local urban forestry NGO, or to dedicate financial resources and/or time volunteering in a substantial capacity for an existing urban forestry NGO. Successful urban forestry NGOs apparently obtain and leverage resources through private donations and other funding sources; they have the capacity to further the management of local municipal trees, by successfully interacting with a wide range of local agencies and decision-makers, as well as other citizen-based organizations. Employees and volunteers associated with urban forestry NGOs would be well-served to receive professional and organizational development training from prominent state agencies, land-grant universities, and other more-established entities. Training content may range from budgetary and organizational operations, to policy, to the use of social media to help spread the word about collaborative urban forest management. As urban centers continue to grow in size, scope, and population, the influence – and need – for urban forestry NGOs will undoubtedly become increasingly important into the 21st century and beyond.

CONCLUSION

A literature review of 185 research articles related to volunteerism in urban forestry in the United States (Chapter 1) revealed that community volunteers in the urban forestry sector are uniquely situated in a community at the intersection of interrelated socio-ecological systems (SES) – a position where social elements interact with biophysical factors like trees and urban infrastructure. In these spaces, volunteers advocate for their urban forest, provide critical advice, and offer thoughtful perspectives. In exchange for an opportunity to learn a new skill, volunteers may broaden their social network, and gain substantial personal satisfaction. Urban forestry volunteers are often organized via a committee or non-governmental organization (NGO), but limited research has formally investigated these entities.

Data derived from a qualitative survey of eighty-one urban forestry NGOs (Chapter 2) from 27 states in the temperate forests of the United States found that each decade there have been increasingly more of these organizations. They vary considerably in terms of size, composition, and even function. A broad set of shared values loosely unites them including that most urban forestry NGOs are formed to extend limited municipal resources and improve UTCC. Private citizens are of the utmost importance in forming, funding, and participating in urban forestry NGOs. Nearly all of these organizations reported utilizing volunteers. Though most of these organizations emphasized operations and activities at a local level, they may find it beneficial to pursue partnerships that are broader in scope, such as with state agencies that leverage federal funding to support urban forestry initiatives and grant opportunities. A resounding portion of respondents indicated that their urban forestry NGO had helped develop,

shape, or implement local urban forestry-related policy in their community. Successfully educating and lobbying by local NGOs and their volunteers may prove to be a viable avenue for enacting local legislation that could impact a community's urban forestry-related practices for generations to come. Successful urban forestry NGOs obtain and leverage resources through private donations and other funding sources; they may advance the management of local municipal trees by interacting with a broad range of local agencies and decision-makers, and other citizen-based organizations. As urban centers continue to grow, the need for urban forestry NGOs will become increasingly important into the 21st century and beyond.

APPENDIX

ELECTRONIC SURVEY QUESTIONS

Urban Forestry Non-Governmental Organization Survey
Urban forestry non-governmental organizations (UF NGOs) have formed across the United States with a range of goals and objectives regarding the management of their communities' urban trees and urban forests. The objective of this investigation is to understand how UF NGOs are established and structured for sustained benefit to the urban forest. This research will create a baseline for future investigations. This survey will take approximately 9 minutes to complete. Please answer all questions based on your UF NGO status prior to any effects of COVID-19. This survey is confidential. Your participation is voluntary, and if you come to any question you prefer not to answer, please skip it and go on to the next.

SECTION 1: UF NGO ORIGIN STORY

Q1 What is the name of your UF NGO?

Q2 What is your role with the UF NGO (e.g. president, manager, field supervisor, forester, volunteer)?

Q2a Are you a volunteer or paid staff?
1. volunteer
2. paid staff

Q3 Does the UF NGO have a website?
1. Yes
2. No

Display This Question: If "Does the UF NGO have a website?" = Yes
Q3a If Yes, please provide the website's URL

Q4 What year was your UF NGO formed?

Q5 Does your UF NGO have a mission statement?
1. Yes
2. No

Display This Question: If "Does your UF NGO have a mission statement?" = Yes
Q5a If yes, what is that mission statement?

Q6 Why was your UF NGO formed?
1. In order to receive state and federal funds
2. To enhance limited municipal resources

3. Improve canopy cover
4. Climate change mitigation
5. Neighborhood improvement
6. Emergency or acute event (i.e. weather, invasive pest)
7. Other, describe

Q7 How engaged (it at all) were the following stakeholders with the formation of the UF NGO?
(Very Engaged, Moderately Engaged, Slightly Engaged, Not Engaged)

1. Federal Agency (i.e. USDA Forest Service)
2. State Agency
3. National/State/Regional NGO
4. University Cooperative Extension System
5. Local Mayor's/Municipal Manager's Office
6. Local Forestry/Urban Forestry Department
7. Local Public Works/Streets/Transportation Department
8. Local Parks Department
9. Local Planning/Community Development Department
10. Local NGO
11. Local Tree Committee/Board
12. Corporation(s)
13. Civic Organization(s)
14. Neighborhood Organization(s)
15. Private Citizen(s)
16. Private Arborist(s)/Contractor(s)
17. Other

SECTION 2: ORGANIZATIONAL STRUCTURE

Q8 Where does your UF NGO focus?

1. Locally
2. Regionally
3. State wide

Q9 Are you a registered non-profit organization?

1. Yes
2. No
3. Not yet, but working on obtaining non-profit status

Q10 Does your UF NGO have a paid staff?

1. No
2. Yes

Display This Question: If “Does your UF NGO have a paid staff?” = Yes
Q10a If you have paid staff, how many?

Display This Question: If “Does your UF NGO have a paid staff?” = Yes
Q10b Please describe staff members positions and hours worked per week.

Q11 Does your UF NGO utilize volunteers?

1. Yes
2. No

Display This Question: If “Does your UF NGO utilize volunteers?” = Yes
Q11a. If yes, how many volunteers annually?

Display This Question: If “Does your UF NGO utilize volunteers?” = Yes
Q11b. If yes, how many volunteers hours annually?

Display This Question: If “Does your UF NGO utilize volunteers?” = Yes
Q11c. Please describe the positions/duties of volunteers.

Display This Question: If “Does your UF NGO utilize volunteers?” = Yes
Q12 How do you recruit new volunteers for your UF NGO? Select all that apply.

1. Public events (e.g. Arbor Day, Earth Day)
2. Farmers markets
3. Word of mouth
4. Social media
5. Newsletter
6. Press release
7. Other, describe

Display This Question: If “Does your UF NGO utilize volunteers?” = Yes
Q13 How do you integrate/onboard volunteers into the organization?

1. Formal Training, Orientation
2. Informal- individuals gain familiarity over time

Q14 Who tends to participate in your organization’s initiative(s)? Select all that apply

1. Individual residents
2. Neighborhood associations
3. Corporate volunteer groups
4. School
5. Other non-profits
6. Other, describe

Q15 Who are your target program participants?

Q16 When conducting a program that aligns with your mission, where do you typically focus efforts within your community? Select all that apply.

1. Residential neighborhoods
2. Commercial areas
3. Street trees
4. City parks
5. Environmental justice areas
6. Other, describe

Q17 What sort of operational guidance (i.e. annual plan of work, budget) does your UF NGO have? Select all that apply.

1. Strategic plan
2. Annual plan of work
3. Budget
4. Direction from board of directors
5. Local Forestry division
6. State agency (i.e. DCR, EPA)
7. Other, describe

Q18 Does your UF NGO employ an ISA certified arborist (or state equivalent) on staff?

1. Yes
2. No

SECTION 3: FUNDING

Q19 What is your annual budget?

1. $0 - $5,000
2. $5,001 - $50,000
3. $50,001 - $100,000
4. $100,001 - $500,000
5. More than $500,000

Q20 How important are the following in relation to funding for your UF NGO? (Very Important, Moderately Important, Slightly Important, Not Important)

1. Federal Agency (i.e. USDA Forest Service)
2. State Agency
3. National/State NGO
4. Local Mayor's/Municipal Manager's Budget
5. Local Forestry/Urban Forestry Department Budget
6. Local Public Works/Streets/Transportation Department Budget
7. Local Parks Department Budget

8. Local Planning/Community Development Department Budget
9. Local NGO Budget
10. Local Tree Committee/Board Budget
11. Corporation(s)
12. Civic Organization(s)
13. Private Foundation
14. Private Citizen(s)
15. Private Arborists(s)/Contractor(s)
16. Other

Q21 How would you categorize the funds your UF NGO receives? Select all that apply.

1. Corporate sponsorship
2. Foundations
3. Donations
4. Grants
5. Fundraising
6. Contracts/Special projects
7. Annual budget allocation (i.e. municipal funding)
8. Other, specify

SECTION 4: PARTNERSHIPS

Q22 How important would you rate the following stakeholders as partners/collaborators? (Very Engaged, Moderately Engaged, Slightly Engaged, Not Engaged)

1. Federal agency
2. State agency
3. Local/Municipal department
4. International Society of Arboriculture
5. State/Regional arboriculture association
6. Arbor Day Foundation
7. American Forests
8. The Nature Conservancy
9. Audubon
10. Forestry organizations (e.g. Mass. Forest Alliance, New England Forestry Foundation)
11. Land Trust
12. Community gardens
13. Botanical gardens
14. Arboreta
15. Cooperative extension
16. Agricultural research station

17. Corporations(s)/Private business
18. Civic organization(s)
19. Private citizen(s)
20. Private arborist(s)/Contractor(s)
21. Other

Q23 How would you describe the quality of your UF NGO's interaction with the state urban and community forestry program?

1. Excellent
2. Good
3. Fair
4. Poor
5. No interaction

Q24 How would you describe the quality of your UF NGO's interaction with the local Tree Warden/Municipal forester?

1. Excellent
2. Good
3. Average
4. Poor
5. No interaction

Q25 How would you describe the quality of your UF NGO's interaction with local municipal officials (i.e. mayor's office, select board, councilors)?

1. Excellent
2. Good
3. Average
4. Poor
5. No interaction

Q26 Has your UF NGO helped to develop, shape, or implement policy in your community?

1. Yes
2. No

Display This Question: If "Has your UF NGO helped to develop, shape, or implement policy in your community?" = Yes
Q26a. If yes, please describe.

SECTION 5: PROGRAMMING

Q27 What is the frequency with which your UF NGO carries out or participates in the following programs? (Routinely, Occasionally, Rarely, Never)

1. Tree planting
2. Tree pruning
3. Tree watering
4. Adult educational classes
5. Youth educational classes
6. Public events (i.e. Arbor Day, Earth Day)
7. Farmers Markets
8. Other, describe

Q28 Is there a means of formally evaluating the success of a program or initiative?

1. No
2. Yes, describe

Q29 Which of the following methods do you utilize, regarding the marketing/public engagement of your NGO? Please check all that apply.

1. Newsletter
2. Listserv
3. Public lectures
4. Press releases
5. Neighborhood association meetings
6. Farmers markets
7. Social media, describe
8. Community fairs/events, describe
9. Other, describe

Q30 How does your organization stay up to date on urban forestry practices and research? Select all that apply.

1. Conferences
2. Workshops
3. Webinars
4. Scientific articles
5. State extension program/land grant university
6. Other, describe

SECTION 6: OTHER

Q31 How has COVID-19 affected your UF NGO?

Q32 Is there anything else that you would like to add about your UF NGO not covered by this survey?

Q33 Are you aware of any other organizations that you think should participate in this research? If so, please list organization name and any contact information if available.

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